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**Will RFID Improve Hygiene in Hospitals?**

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Everyone knows being around sick people is not good for your health. That is why the incidence of healthcare-associated infections (HAI) in hospitals has always been a great concern.

The Centers for Disease Control estimate deaths from HAI at nearly 100,000 per year in the United States. That makes HAI a top 10 leading cause of death in America. Though most are not fatal, HAIs affect 7-10% of hospitalized patients, according to University of Virginia researchers.

Increasingly, these infections are being caused by pathogens that are resistant to standard antibiotics, such as methicillin-resistant *Staphylococcus aureus* (MRSA).

"A 200-bed hospital incurs \$1,779,283 in annual MRSA infection-related expenses attributable to hand hygiene noncompliance," according to the physicians at Duke University and Wayne State University who authored a 2010 report estimating actual MRSA-related dollar costs.

"A one per-cent increase in hand hygiene compliance resulted in annual savings of \$39,650 to a 200-bed hospital," the report said. A 5% improvement in compliance thus could save a hospital nearly \$200,000 a year.

Despite the studies and statistics, hand hygiene adherence is around 50% in the best of cases. A year-long pilot we've been running in Miami is showing RFID can contribute to increased compliance.

Most hand hygiene efforts among healthcare workers have centered on reminding workers to wash their hands. Internal posters and memos have been supplemented by increased hand-cleaning stations.

"The solution comes down to trying to instill behavioral change in health care workers," according to Dr. Keith Kaye, co-author of the Duke-Wayne State study on hospital infection rates.

"They don't want to hurt patients, but they are busy and multitasking. If hand hygiene

practices are not ingrained and do not prompt an automatic reaction to reach for the hand sanitizer, they aren't going to happen."

### **Helping to shift the healthcare culture**

Kaye believes a major cultural shift among healthcare workers is essential if technology is to succeed. He advises that leadership from hospital or local-unit staff is needed if people are to be held to standards.

The World Health Organization guidelines that define key times healthcare workers should wash their hands or use alcohol-based hand rubs from dispensers.

1. Before touching a patient
2. Before clean/aseptic procedures
3. After body-fluid exposure or risk
4. After touching a patient
5. After touching patient surroundings

Researchers at the Johns Hopkins University School of medicine conducted a study which suggested that electronic monitoring of hand-hygiene improved compliance and decrease HAI rates. They monitored and tracked hand-washing by physicians, nurses, nursing support personnel, ancillary staff, visitors and family members in the intermediate care unit.

### **Combining RFID and IR to create a solution**

The most advanced and potentially most impactful electronic monitoring system is an automated interactive monitoring technology currently being tested by the University of Miami's Jackson Memorial Hospital in Florida. Our team at Dynamic Computer Corporation developed the solution which is proving how RFID and infrared (IR) technology can be used to reduce HAI.

Jackson Memorial has launched a pilot study in which volunteer staff members are wearing battery-powered tags on their wrists or around their necks. These tags contain an RFID chip that identifies the employee by name along with an infrared chip that communicates with sensors in hand-sanitizing dispensers.

When an employee presses the dispenser, it scans for an IR signal and captures the employee's ID number. The RFID tag then transmits the badge's ID number, date, time and location to a reader. Software interprets the data to confirm that the individual sanitized his or her hands.

The system measures the time between hand-cleaning and arrival at a patient's bed, where another sensor detects the caregiver's presence. Employees who have not sanitized their hands receive a voice alert, requesting them to do so.

The pilot program has been in operation since July of last year and currently is being evaluated and fine-tuned by Dynamic. Results are showing us this RFID/IR solution will typically return a hospital's investment within a year.

Dr. Kaye of Wayne State notes that RFID devices can capture many more observations than human monitoring can. "It's objective and more precise because the numbers are bigger. Its data you can take at face value. Having that sort of health-care-worker-compliance data and feeding it back to providers, benchmarking it against colleagues, can be a very powerful tool. When these devices are demonstrated to be effective, functional and affordable, I hope there will be more rapid buy-in to these kinds of systems."

While the new technology is showing great promise, Kaye points out that technology by itself is not likely to improve hand hygiene. "It's what you do with the data. . . People need to be held accountable," he adds. "In health care, no one will drop dead immediately if a worker doesn't wash her hands."

Using technology to encourage hand-hygiene compliance requires a leap in institutional culture. Results certainly will be most effective when institutional change is integrated with appropriate technology budgets. RFID and IR technology testing has produced exceptional improvements in efficiency, productivity and accuracy. This can provide the significant overall cost savings shown in the studies.

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